DOCUMENT RESUME

ED 024 717 UD 006 872

By- Brown, Roscoe C., Jr.; Henderson, Edward H.

THE FACTOR STRUCTURE OF VARIABLES USED IN THE PREDICTION OF PERFORMANCE OF COLLEGE STUDENTS FROM DISADVANTAGED BACKGROUNDS.

Pub Date 13 Nov 67

Note- 8p.; Paper presented at the meeting of Educational Research Association of New York State (November 13, 1967).

EDRS Price MF-$0.25 HC-$0.50

Descriptors- College Placement, College Programs, *College Students, *Disadvantaged Youth, Intelligence Factors, Performance Factors, Personality, Predictive Measurement, Standardized Tests, Statistical Analysis, Student Evaluation, *Success Factors

Identifiers- New York University, Project APEX

The document presents the findings of a multiple regression analysis and a factor analysis of variables used in the prediction of student performance after two years of participation in Project APEX. This project seeks to demonstrate that 24 disadvantaged students with college potential can succeed in a special university program. Subjects were given three months of college preparatory instruction prior to admission to a special program at New York University. The factor analysis showed that the students' performance is a function of the interaction of intellectual and personality characteristics. It is suggested that "continued emphasis should be placed on the importance of motivation and personality in the college achievement of students from disadvantaged backgrounds." (See also UD 006870.) (NH)

0687

ED 024717

THE FACTOR STRUCTURE OF VARIABLES USED IN THE PREDICTION OF PERFORMANCE OF COLLEGE STUDENTS FROM DISADVANTAGED BACKGROUNDS[1]

Roscoe C. Brown, Jr.
and
Edward H. Henderson
New York University

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINION STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

INTRODUCTION:

The data reported in this paper were derived from Project APEX, a college program for youth from disadvantaged backgrounds. The purpose of Project APEX is to demonstrate that low income youth of promise but untapped potential can profit measurably from experience in a special university program and that some can complete college and become teachers. Sixty young men from various ethnic backgrounds who were disadvantaged were selected from the graduating seniors in the general curriculum of Morris High School and Benjamin Franklin High School in June, 1965. They entered New York University in July 1965 for a two month educational program. After completion of the summer program they participated in a one-month program of study and work at the New York University camp at Holmes, New York. The students returned to the campus in late September, 1965 to begin formal class instruction which has continued to this date.

The pace of instruction and the rate at which the students have been integrated into the regular University academic program has been varied to account for the differences in the rate of development of the students. An intensive evaluation of each student has been made at the end of each term and each summer. On the basis of these evaluations, instructional programs

UD 006 872

[1]This Project was supported by the Office of Economic Opportunity and The Vincent Astor Foundation.

Presented at meeting of Educational Research Association of New York State, November 13, 1967

were designed for individual student's in terms of their progress and needs. In the first two years, most of the students have taken a combined program of special credit courses especially designed for the APEX students and selected liberal arts courses in the "A", all-university division of the University. The students were given the opportunity to participate in remedial reading instruction and tutoring. This report presents the findings of a multiple regression analysis and, factor analysis of variables used to predict the students' performance at the end of two years in the program.

RESULTS:

Following variable were used in multiple regression analyses to predict the students' (N=24) grade point average at the end of two years in the project:

1. Self Image Scale
2. APEX Teachers Rating of Students Motivation
3. F (Authoritarianism) Scale (Spring 1967)
4. D (Dogmatism) Scale (Spring 1967)
5. OAIS Achiever Personality
6. OAIS Intellectual Quality
7. OAIS Creative Personality
8. F (Authortarianism) Scale (December,1965)
9. D (Dogmatism) (December,1965)
10. TAT Motivation Scale
11. Ohio State Psych. Similarities
12. Ohio State Psych. Analgies
13. Ohio State Psych. Reading
14. Ohio State Psych. Total
15. Stanford Paragraph Meaning (April,1966)

16. Cumulative Grade Point Average (Spring,1967) Dependent Variable.
17. WAIS Verbal Scale
18. WAIS Performance Scale
19. WAIS Information Scale
20. WAIS Comprehension Scale
21. Stanford Reading (July,1965)
22. WAIS Arithmetic Scale
23. WAIS Similarities
24. WAIS Object Assembly

The highest multiple R was found when 21 variables were used in the prediction. The R was .984. (Table 1) The F test for goodness of fit was not significant, however. The highest R where the goodness of fit to the actual data was significant was R = .646 using WAIS Information, Similarities, and Object Assembly.

Other multiple correlations were higher, the correlations increasing as additional variables representing non-intellectual factors were added, but the regression did not fit the actual data. The findings suggest that the WAIS scores are the most reliable predictors of the grade point average of the students who remained in the project, although they did not differentiate between those who left the project and those who remain.

A factor analysis using the IBM 360 Factor Analysis program with the Varimax Rotation was computed for the variables used in making the predictions of the students' performance to determine the factor structure of the variables.

Eight factors were identified. Using a loading of .4 or more to identify the variables with significant loadings on each factor the following factors were identified:

FACTOR 1.

Variable	Loading
OAIS Achiever Personality	-.587
OAIS Intell. Quality	.557
Ohio State Similarities	.761
Ohio State Total	.526
Read (Spring '66)	.497
WAIS Verbal	.756
WAIS Information	.781
Read. (July '65)	.580

This factor is an intellectual achievement and motivation factor.

This factor accounts for 20.35% of the variance.

FACTOR 2.

VARIABLE	LOADING
F Scale (Spring '67)	-.866
D Scale (Spring '67)	-.845
F Scale (Dec.'65)	-.739
D Scale (Dec.'65)	-.877
Ohio State Reading	.486
Reading (Spring '67)	.467

This factor is an authority-dogmatism factor. Reading and authority-dogmatism are negatively related. This factor accounts for 16.98% of the variance.

FACTOR 3.

Variable	Loading
OAIS Achiever Personality	.464
Ohio State Reading	-.478
WAIS Performance	.553
WAIS Comprehension	.545

This factor accounts for 13.23% of the variance and could be called an achiever-performance factor.

FACTOR 4.

Variable	Loading
OAIS Creative Performance	.762
TAT Motivation	.545
Reading (Spring '66)	.477
Reading (July '65)	.599

This is also a motivational factor which is reflected in Reading Achievement. This factor accounts for 8.28% of the variance.

FACTOR 5.

Variable	Loading
Teachers Motivation Rating	-.670
Grade Point Average	-.505
WAIS Performance	-.413
WAIS Similarities	-.863

This factor is a teacher-evaluation of performance factor and accounts for 7.15% of the variance.

FACTOR 6.

Variable	Loading
Ohio State Analogies	-.910
Ohio State Total	-.528

This is an intellectual-Ohio State Psych. factor and accounts for 5.63% of the variance.

FACTOR 7

Variable	Loading
WAIS Arithmetic	.904

This is an arithmetic factor and accounts for 5.27% of the variance.

FACTOR 8.

Variable	Loading
Self Image Scale	.814
OAIS Intell. Quality	.469
Grade Point Average	.595

This factor could be called Student-Assessment of Achievement and accounts for 4.19% of the variance.

All eight factors account for 81.08% of the variance.

Three of the factors are concerned with intellectual achievement, four factors are concerned with student motivation and personality and one factor deals with teacher evaluation of performance.

The results of the factor analysis point up the fact that the performance of the students in the program is a function of intellectual and personality characteristics interacting with each other. The factors accounting for most of the variance in the factor analysis are factors that are composed of both intellectual and personality variables. This finding should not be too surprising in view of the fact that the students were selected largely on the basis of their motivation and desire to attend college rather than their academic performance in high school. The results of this study suggest that continued emphasis should be placed on the importance of motivation and personality in the college achievement of students from disadvantaged backgrounds.

TABLE 1

PREDICTION OF APEX STUDENTS PERFORMANCE AFTER TWO YEARS IN THE PROJECT

Variable	Mean	Standard Deviation	Regression Coefficient
Self Image Scale	47.19165	24.63876	-0.01517
APEX Teachers Rating of Student's Motivation	48.64789	6.94718	-0.01549
F Scale (Spring 1967)	113.87500	22.37100	-0.01214
D Scale (Spring 1967)	145.62500	27.06966	0.04750
OAIS Achiever Personality	54.20833	25.48311	0.02204
OAIS Intellectual Quality	20.16666	18.58856	-0.02421
OAIS Creative Personality	52.55415	26.07336	0.02083
F Scale (December 1965)	119.83333	17.86095	0.01197
D Scale (December 1965)	157.37500	25.02835	-0.05213
TAT Motivation Scale	12.12500	8.49712	-0.00403
Ohio State Psych Similarity	19.08333	15.47764	-0.09199
Ohio State Psych Analysis	25.66666	18.74696	-0.18075
Ohio State Psych Reading	30.12500	16.13074	-0.17502
Ohio State Psych Total	23.58333	13.10133	0.39116
Stanford Paragraph Meaning (April, 1966)	8.69999	1.71007	-0.46733
WAIS Verbal Scale	105.12500	5.82582	-0.13369
WAIS Performance Scale	101.83333	10.19235	-0.04381
WAIS Information Scale	10.87500	1.75233	-0.41567
WAIS Comprehension Scale	12.83333	2.61545	0.01872
Stanford Reading (Jult, 1965)	7.52083	1.48616	1.11957
WAIS Object Assembly	10.00000	2.18692	0.33088
DEPENDENT			
Cumulative Grade Point Average (Spring, 1967)	1.64499	0.43633	

MULTIPLE CORRELATION	0.98445
STD. ERROR OF ESTIMATE	0.25996

TABLE 1 (continued)

PREDICTION USING ALL VARIABLES

ANALYSIS OF VARIANCE FOR THE REGRESSION

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value
Attributable to Regression	21	4.24364	0.20208	2.99034
Deviation from Regression	2	0.13515	0.06758	
TOTAL	23	4.37879		